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DRAFT

QUALITY ASSURANCE PROJECT PLAN
FOR
ENGINEERING EVALUATION / COST ANALYSIS
AT THE AVERY LANDING SITE
AVERY, IDAHO

Revision 2

Submitted to:

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Submitted by:

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February 20, 2009

073-93312-02.002

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GLOSSARY

ACRONYM AND ABBREVIATION LIST

AOC	Administrative Order on Consent
ARAR	applicable, relevant, or appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EE/CA	Engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
FCR	Field Change Request
Golder	Golder Associates Inc.
HASP	Health and Safety Plan
IDEQ	Idaho Department of Environmental Quality
ICN	Interim Change Notice
IDW	Investigative derived waste
LCS	Laboratory control sample
MCL	Maximum contaminant level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MS/MSD	Matrix spike and matrix spike duplicate
µg/L	Microgram/liter
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons for diesel and extended range organics
NWTPH-HCID	Northwest Total Petroleum Hydrocarbons for hydrocarbon identification
PAHs	Polynucleated aromatic hydrocarbons
Potlatch	Potlatch Land and Lumber, LLC and Potlatch Corporation
PRP	Potentially Responsible Party
PQL	Practical quantitation limits
QC	Quality Control
QAPP	Quality Assurance Project Plan
SID	Sample Integrity Data
SAP	Sampling and Analysis Plan
Site	Avery Landing Site, Avery Idaho
Work Plan	Engineering Evaluation/Cost Analysis Work Plan for the Avery Site

1.0 INTRODUCTION

1.1 Project Objective

This Quality Assurance Project Plan (QAPP) is prepared for removal actions at the Avery Landing Site (Site), and in support of the Engineering Evaluation / Cost Analysis (EE/CA) Work Plan (Work Plan) prepared by Golder Associates Inc. (Golder) for Potlatch Land and Lumber, LLC (Potlatch). This QAPP is Appendix A to the Sampling and Analysis Plan (SAP) and will be used in conjunction with the Work Plan. The QAPP was prepared in substantial accordance with the document EPA QA/R-5, 'EPA Guidance for Quality Assurance Project Plans' (EPA, 2001) and provides procedures for making accurate measurements and obtaining representative, accurate, and precise analytical data.

1.2 Site Background and History

The Site is located in the St. Joe River Valley in the Bitterroot Mountains in northern Idaho and encompasses approximately 10 acres. The Site borders the St Joe River about 0.75 miles west of the town of Avery, Idaho. The Site was used as a Milwaukee Railroad maintenance and fueling station from 1907 to 1977, and contained a railroad roundhouse, maintenance, repair, and fueling depot. Presently the Site is relatively flat ground with gravel and sparse vegetative growth and few structures remain.

There are primarily four properties located on the Site: The Federal Highway Administration property includes Highway 50 and its easement; the Bentcik property includes the eastern half of the Site with numerous monitoring wells and piezometers for monitoring groundwater; the Potlatch property with several buildings and utility hook-ups on its western portion and, the State of Idaho property consisting of the bed and banks of the St. Joe River. A domestic groundwater supply well is in the western portion of the Potlatch property for use by residents and visitors. The eastern portion of the Potlatch property is vacant with numerous monitoring wells and piezometers that are used for monitoring groundwater.

The Work Plan has been developed pursuant to an Administrative Order on Consent (AOC) agreed to between Potlatch and the U.S. Environmental Protection Agency (EPA). This QAPP is prepared to establish quality procedures for the collection, handling, transport, analytical testing, and data review process for all samples acquired to characterize the Site.

1.3 Site Description

A discussion of the Site is provided in Section 2 of the Work Plan. Site Location figures and maps are included with the Work Plan.

1.4 Sampling Program Design

A detailed description of Site objectives is provided in Section 1.2 of the Work Plan, with the overall intent to provide a range of removal/treatment options, with appropriate analyses of their effectiveness, cost and ability to be implemented in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Clean Water Act (CWA) requirements for the Site. Sampling locations and frequency, and the sampling procedures and analyses to be performed are presented in the SAP as Attachment B to the Work Plan. The locations of known impact to the Site are described in the text and illustrated on figures of the Work Plan.

2.0 PROJECT ORGANIZATION

2.1 Organizational Structure

The organizational structure for field activities at the Potlatch property is shown graphically in Figure QAPP 1-1. All key project personnel can be reached at the following addresses:

	Golder Project Manager	Golder Field Task Leader	PRP Project Coordinator
Contact:	Mr. Douglas Morell dmorell@golder.com	To Be Determined	Mr. Terry Cundy Terry.Cundy@potlatchcorp.com
Company:	Golder Associates Inc.	Golder Associates Inc.	Potlatch Land and Lumber, LLC
Address:	18300 NE Union Hill Road, Suite 200 Redmond, Washington 98052-3333	1200 W. Ironwood Drive, Coeur d'Alene 99201	530 S. Asbury, Suite 4 Moscow, ID 83848
Phone:	(425) 883-0777 Work	(208) 676-9933 Work Cell (208) 755-3002	208-883-1668 Work Cell 208-301-0410
Facsimile:	(425) 882-5498	(208) 676-8602	N/A

Project Manager

Project Manager, Mr. Douglas Morell, is responsible for planning and coordinating all Golder activities to meet scheduling requirements. Mr. Morell will be involved in day to day discussions with the Potlatch PRP Project Coordinator, and collaboration with the Golder Field Task Leader. He will provide guidance on analytical interpretation, quality assurance efforts, and all report products. He will also provide review for the technical quality, interpretations and conclusions presented in the Removal Report.

Field Task Leader

Field Task Leader, To Be Determined, is responsible for planning and executing all environmental sampling and analysis, for preparation of analytical data reports, preparation of the removal report and all associated Technical Memoranda including submittals to EPA with oversight from the Project Manager. The Field Task Leader prepares the specifications for, and administers the subcontracts for laboratory analysis. The Quality Assurance Coordinator reviews aspects of quality control. Work plan tasks, referenced method quantitation limits, regulatory compliance levels, and other pertinent documents will be reviewed and assessed to determine if data quality objectives are being met.

Health & Safety Officer

Health and Safety Officer, Ms. Jane Mills, C.S.P. is responsible for developing the site Health and Safety Plan (HASP) and communicating the key elements of on-site safety to the field personnel, including personal protective measures and equipment, emergency preparedness, and incident protocol. Due to the remoteness of the Site, Ms. Mills will also ensure adequate communication equipment is available to field personnel for contact in case of field mishaps.

Chemist/Validator

The Chemist/Validator, Mr. Tom Stapp reports to the Project Manager. He is responsible for coordinating with the offsite laboratories to obtain required analyses, and for sample tracking, chain of custody, and other sampling and analysis documentation. The Chemist/Validator maintains the data center files, including tabulating, compiling, and archiving data. The Chemist/Validator is responsible for the review and validation of laboratory analysis reports.

Investigative Field Team

The Investigative Field Personnel report to the Project Manager. Golder's Investigative Field Team To Be Determined and Ms. Bryony Stasney, L.G., L.Hy., Hydrogeologist. These individuals are responsible for collecting all field samples in accordance with the Work Plan, SAP and QAPP. In addition, the Field Personnel are responsible for assembly, organization, and maintenance of all information collected during field activities (including sampling logbook, field parameter records, daily activity logbook, chain-of-custody forms, and water-level measurements).

Golder Remedial Design Team

The principle members of the Golder Remedial Design Team will be lead by Mr. Tim Martin P.E. Design Leader in consultation with Mr. Morell. Golder will also rely on Mr. Lee Holder, P.E., Process Engineer as part of the Golder Environmental Remediation Group to bring innovative ideas towards realizing an effective cleanup action.

2.2 Use of Subcontractors

Golder will use local support contractors as needed for project execution. A surveyor will be selected as needed if additional Site characterization is required, and will be licensed in the State of Idaho for conducting geodetic surveys. Contractors involved in earth moving, push-probe sampling, drilling, or test pit excavation as needed, will also be licensed in the State of Idaho. The subcontracted laboratory, Test America, Inc., is located in Spokane, Washington and conforms to national standards for laboratory accreditation and use of EPA sponsored analytical methodologies. Golder field personnel will ensure the work performed by these subcontractors is in conformance with Golder Technical Procedures.

Subcontractors in the field that may become exposed to Site chemicals must have crew members with current OSHA 40 hour Health and Safety training on-site in substantial compliance with federal regulations. Training certificates for each worker must be maintained on-site during working hours for the duration of the project. Each certificate should have the worker name, date of attendance for the 40 hour training or refresher course, and signature of attending instructor.

Analytical Laboratory

The selection of an appropriate laboratory is based upon the need for data quality, timeliness, and logistics for sample transport and proper handling of samples to meet holding times. The primary laboratory is located near northern Idaho and meets these requirements.

- Test America Analytical Services in Spokane, Washington. (Formerly, North Creek Analytical), will serve as the prime laboratory for certified analysis. Test America / Spokane will facilitate the handling of all samples and may transfer some test requirements to a 'sister'

laboratory in Bothell, Washington (Test America / Bothell). Test America holds, as a broad national network of laboratories, current accreditation in the states of Idaho and Washington for petroleum analyses associated with groundwater, drinking water, soils and solid wastes, using a variety of methods. The methods include Washington State Department of Ecology guidance for petroleum hydrocarbons (Ecology, 1997), the EPA SW-846 manual of "Test Methods for Evaluating Solid Wastes" (EPA, 1986), or the Environmental Monitoring Systems Laboratory (EPA, 1994) manual for drinking water tests. Tests for water samples that have potential use as drinking water will be sent to the Test America / Bothell laboratory, since that laboratory currently holds accreditation with the State of Idaho for analysis of drinking water standards for water analytes of concern that are included in Tables QAPP-5 through QAPP-7.

Test America Contact: Ms. Randy Decker (509) 924-9200

Test America, Spokane, Washington
Accreditation Status: Washington State Department of Ecology
Accreditation # C1259 (Laboratory ID)
Expires, January 6, 2010

Test America, Bothell, Washington
Accreditation Status: Idaho State Bureau of Laboratories
Accreditation is approved through the Idaho Department of Health & Welfare (EPA Laboratory ID # WA01217)
Expires, June 30, 2009

- On-Site Environmental, Inc. is a western Washington laboratory, accredited in the State of Washington for analytical methods created by the EPA, Standard Methods, and ASTM, for total petroleum hydrocarbon methods. Their methods are appropriate for groundwater, drinking water, soils and solid wastes. On-Site Environmental will be used as a backup laboratory, for split samples, and for confirmational analysis.

On-Site Environmental Contact: Mr. Blair Goodrow (425) 883-3881

On-Site Environmental, Inc., Redmond, Washington
Accreditation Status: Washington State Department of Ecology
Accreditation # C1309 (Laboratory ID)
Expires, July 26, 2009

3.0 DATA QUALITY OBJECTIVES

3.1 Appropriate Analytical Methods

An objective of the field sampling activities is to provide analytical data that is of known and defensible quality. Tables QAPP-4 through QAPP-7 list all analytical parameters of interest defined for groundwater and soil sampling during the site investigation. The complete list of parameters may include analyses using:

- Northwest Total Petroleum Hydrocarbons for hydrocarbon identification (NWTPH-HCID)
- Northwest Total Petroleum Hydrocarbons for diesel and extended range organics (NWTPH-Dx)
- EPA SW-846 methods for carcinogenic poly-aromatic hydrocarbon compounds and naphthalene (EPA 8270C)
- EPA SW-846 methods for metals in soil (EPA 6010C/ 6020A) and groundwater (EPA 200.7/ 200.8)
- EPA SW-846 methods for polychlorinated biphenyls (PCBs) in soil and water (EPA 8082A).

All well water and surface water samples will have standard field parameters measured including temperature, pH, conductivity, dissolved oxygen, and turbidity.

Petroleum constituents (diesel and heavy oil) will be analyzed using northwest methods for petroleum hydrocarbons (NWTPH-Diesel Extended) (Ecology, 1997). EPA test methods for PAHs and metals are as defined in SW-846 (EPA, 1986) as applicable.

The objectives for analytical data quality are defined in terms of the quantitation limits achievable using the referenced analytical methods, and in terms of the resulting goals for precision, accuracy, representativeness, completeness, and comparability of analytical data. Quantitation limits are provided for each analytical parameter in Tables QAPP-4 through QAPP-7 and are cross-referenced to applicable standard reference methods. The quality objectives established for the EE/CA investigation and monitoring are described as follows:

- Precision: Analytical precision shall be reported as required by the governing reference methods cited in Tables QAPP-4 through QAPP-7. At a minimum, data validation criteria for analytical precision will reference the governing methods.
- Accuracy (Bias): Accuracy shall be reported as required by the governing reference methods cited in Tables QAPP-4 through QAPP-7. At a minimum, data validation criteria for analytical accuracy will reference the governing methods.
- Representativeness: Goals for sample representativeness are addressed qualitatively by the sampling locations and intervals defined in the SAP. In addition, the use of standard procedures for sample acquisition (as described in Section 4 of this QAPP) will facilitate the collection of representative data.
- Completeness: Completeness is defined as the percentage of valid analytical determinations with respect to the total number of requested determinations in a given sample delivery group; completeness goals are established at 90 percent. Failure to meet this criterion shall be documented and evaluated in the data validation process described

in Section 6 of this QAPP, and corrective action taken as warranted on a case-by-case basis.

- Comparability: Approved analytical procedures shall require the consistent use of the reporting techniques and units specified by the reference methods cited in Tables QAPP-4 through QAPP-7 in order to facilitate the comparability of data sets from sequential sampling rounds and from split laboratory submissions in terms of their precision and accuracy.

4.0 SAMPLING AND OTHER FIELD PROCEDURES

4.1 Selected Procedures, by Task

Technical procedures have been developed to support sampling activities, monitoring actions, data validation, and other technical activities. Reference to technical procedures applicable to individual activities, are provided in Table QAPP-1, ('Golder Technical and Quality Procedures List'), and complete copies are kept on file in Golder archives. Field team members have unlimited access to the technical procedures and generate or review copies as needed to maintain the quality steps necessary to complete field activities.

Technical procedures are provided as guidance to technical personnel and as such, require the specific circumstance of application or the knowledge of the field scientist to appropriately apply the guidance criteria. Some technical procedures may have duplicate or similar information provided in other technical procedures that is necessary to be included to provide continuity to the content of the document. Significant changes from the guidance provided in the technical procedures will be identified and documented using procedures in the following section.

4.2 Document Distribution, Variation Request, and Change Control Considerations

The technical procedures and all other procedures cited in this QAPP are subject to the distribution control requirements of Quality Procedure QP-5.1, "Document Preparation, Distribution, and Change Control." Variations from established field procedure requirements may be necessary in response to unique circumstances encountered during sampling activities. All such variations must be documented on a Field Change Request (FCR) form and submitted to the Project Manager for review and approval. A copy of the Field Change Request form is presented in Technical Procedure TP-1.2-23 "Chain of Custody".

The Project Manager or his assigned Field Sampling Personnel are authorized to implement non-substantive variations based on immediate need, provided that the Project Manager is notified within 24 hours of the variation, and the FCR is forwarded to the Project Manager for review within 2 working days. Substantive variations require notification of the Project Manager and Client Project Coordinator before implementation and a FCR is forwarded for review within 2 working days. If the variation is unacceptable to either reviewer, the activity shall be re-performed or other corrective action taken as indicated in the "Comments" section of the FCR. A copy of the FCR shall be included with all field reports, as well as the data validation report. Changes to the requirements of this QAPP or the EE/CA Work Plan shall be controlled through the Interim Change Notice (ICN) procedures as discussed in Section 6.5.2 of QP-5.1.

4.3 Sample Quantities, Types, Locations, and Intervals

Sample quantities, types, locations, and intervals for the groundwater, surface water and soil sampling shall be as specified in the Work Plan and SAP. Field quality control samples shall be included in the minimum quantities specified in Section 7 of this QAPP. Appropriate documentation of the purpose of the sample shall be maintained in the field log, and identified by the assigned sample number; copies of sample identification records shall be separately provided to the data validator. See Section 6 of this QAPP.

4.4 Sample Identification and Labeling Requirements

Sample labels will be attached to each sample container with an assigned field sample identification number applied as each sample is collected during the field activities. The sample identification numbering scheme will be as determined during the field sampling event and will be explained in the field notebook and/ or recorded on the Sample Integrity Data (SIDs) sheets. SIDs shall be completed for all surface water and well water sample collection locations where field parameter data will also be collected. The number system will appear on each sample bottle or container collected and will identify a unique sample identification number applied to one collection sequence for one sample, regardless of the number of bottles and containers collected. The number system will ensure field quality control (QC) samples will remain indistinguishable from the field locations. The label will contain the sampler's initials, one collection date, and one collection time appropriate for each sample, and will be cross referenced by the sample number to identify the location, depth, and monitoring well or geological data in the field notes. An example label is shown below:

GOLDER ASSOCIATES INC.
(425) 883-0777
Sample ID #: 06P09-10.5
Date:
Time:
Initials: Analysis: Preservative:

Each sample bottle label will also identify the laboratory analysis to be performed, noting the identified method number as stated in Tables QAPP-5, QAPP-6, and QAPP-7 and the preservative added for the appropriate analytical parameter as indicated on the bottle label. Identification numbers shall be recorded in the field notebook, SIDs, and on the chain of custody/sample analysis request form supplied by the analytical laboratory.

4.5 Sample Container Type, Volume, Preservation, and Handling Requirements

All sample containers, container preparation, preservatives, trip blank, and sample storage chests shall be provided by the analytical laboratory as part of their agreement for services. Sample container type, volume requirements, preservation requirements, and special handling requirements are listed by analytical category in Table QAPP-2 for groundwater, and Table QAPP-3 for soil.

All samples shall be sealed, labeled, properly identified, and submitted to the analytical laboratory under formal chain of custody requirements as described in Section 4.6 of this QAPP. Transport sample chests will be secured with a custody seal on the outside, with signature and date provided by the attending field scientist.

4.6 Chain of Custody Considerations

All samples obtained during the course of this investigation shall be controlled as required by procedure TP-1.2-23, "Chain of Custody". Chain of custody forms shall be completed for each shipment of samples as described in the procedure. Chain of Custody forms shall specifically identify the applicable reference methods specified in Tables QAPP-5 through QAPP-7 as appropriate for each individual sample. All laboratory sample tracking procedures shall ensure traceability of analytical results to the original samples through the analytical method referenced on the chain of

custody, and the laboratory applied tracking number. The laboratory tracking number will be traceable to unique sample identification numbers as specified in Section 4.4 above.

4.7 Sampling Equipment Decontamination

All non-dedicated sampling equipment (in contact with sample) shall be thoroughly cleaned prior to each sampling event to prevent cross-contamination between samples and to ensure accurate representation of analytes of interest in each sample interval. Non-dedicated equipment shall be cleaned with a brush and non-phosphate detergent, water mixture so that all visible solid matter is removed. A second wash is performed after the detergent/water wash. Steam cleaning may be conducted on excavation equipment used at locations targeted for sampling or down-hole soil sampling equipment in place of hand washing. Sampling tools shall be disassembled or staged as necessary pending their next use. Sampling tools shall be placed in clean, dedicated drums or sealed in clean plastic bags to protect from ambient contamination. Personnel performing decontamination shall wear rubber gloves, face or eye shields, and such other safety equipment as directed by the project-specific HASP.

Should visible matter remain on the non-dedicated equipment after the detergent/water wash, the full complement of wash procedures shall be repeated. If the non-dedicated equipment retains visible matter after the repeated actions, the equipment will be retired from the sampling procedures and not used again. Samplers shall be reassembled using clean rubber gloves; all decontaminated samplers and sampling tools shall be sealed in clean plastic bags pending their next use. All wash and rinse fluids shall be transferred to storage drums for short-term storage on-site, pending characterization and final disposal at the direction of the Project Manager.

4.8 Investigative Derived Wastes (IDW)

Soil cuttings, and borehole residuals may be generated as investigative derived solid waste material that cannot, or otherwise will not be returned to the borehole. Likewise, purge water from well locations will be identified as investigative derived liquid waste (IDW) that must be containerized. The investigative derived waste is the responsibility of the field scientist at the time the IDW is generated. Solid and liquid IDW will be separated and segregated to the extent possible. Solid IDW that can be determined in the field to be non-impacted or minimally impacted, will be sequestered from heavily impacted soils for future designation. Heavily impacted IDW will be containerized. In most cases the IDW will be stored in steel drums (Type 17H) at the site. Each drum shall be labeled by the field scientist, secured with a bolted lid, and placed at the job site in a location where the potential for tampering is minimized. The label requirements will include identification of the contents, the IDW matrix, the date of generation, and a phone number contact for the Golder Project Site manager.

Soil and water samples generated for testing purposes will become the responsibility of the laboratories tasked for the appropriate analyses. As such, all disposal responsibilities will remain with each laboratory at the conclusion of the testing activities for spent samples.

4.9 Calibration Requirements

Calibration of all measuring and test equipment, whether in existing inventory or purchased for this investigation, shall be controlled as required by procedure QP-11.1, "Calibration and Maintenance of Measuring and Test Equipment." Lease equipment shall require certifications or other documentation demonstrating acceptable calibration status for the entire period of use for this project. Field

calibration requirements shall be in compliance with the technical procedure describing the instrument's use and/or with the manufacturer's instructions issued with the equipment. Method and analytical equipment-specific calibration requirements applicable within the individual analytical laboratories are addressed by the individual laboratory QA plans or the analytical method.

5.0 ANALYTICAL PROCEDURES

Tables QAPP-4 through QAPP-7 cross-reference the analytes of interest of this investigation to the standard reference methods. Practical quantitation limits (PQLs) for analytes in soils and water samples are given and shall be established as contractual requirements between Golder and the subcontracted analytical laboratory. The subcontracted laboratory is responsible for implementing the analytical methods selected, documenting through Standard Operating Procedures (SOP) modifications (if any) to the methods, and providing these documents for review upon request. Any changes to the method number selected for analysis and identified in Tables QAPP-4 through QAPP-7 must first be brought to the attention of the project manager in writing before analysis can begin.

The contractual requirements for PQLs in soils and water samples are based on potential applicable, relevant, or appropriate requirements (ARARs) established for the site work under State and Federal regulations as indicated in Table QAPP-4 through QAPP-7. PQLs in most cases are below the "Most protective cleanup level for soil, surface water and groundwater". However, the PQL for thallium can be found "shaded" in Table QAPP-5, since the laboratory PQL exceeds the most stringent ARARs considered for the site. Therefore, since the established method is one of the best available technologies for determination of this analyte, laboratories may be asked to report data below the PQL, and down to the method detection limit (MDL) to determine a viable value. As a consequence, this value will be identified as "estimated" in accordance with data validation criteria for analytes that fall below the 99% confidence criteria.

Instances of PQLs found above the most protective cleanup level will be brought to the attention of the Project Manager and analytical results will be assessed by matrix and location at the conclusion of the Remedial Investigation. All other PQLs shall be considered adequate for the removal and remedial actions for soil and water samples.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 Minimum Requirements for Laboratory Analytical Data Packages

All analytical data packages submitted by the analytical laboratory shall include the following:

- Sample receipt "condition found" records, noting dates of sample collection, shipment, laboratory receipt, and disposition of sample quality including temperature, breakage, and custody seals.
- Shipping receipt documentation including identification of shipping personnel (or organization).
- Copies of completed chain of custody documentation including communications of field personnel by hand written note, facsimile, or e-mail transmittal.
- Analytical hard copy (paper) summary results for each sample containing neat or dilution adjusted results for all analytes/constituents requested in the chain of custody and request for analysis or purchase order.
- Analytical quality control results and summary documents for laboratory method blanks, laboratory duplicates, laboratory control samples, blank spike/blank spike duplicates, matrix spike/matrix spike duplicates, serial dilutions, quality reference materials, surrogates and internal standards.
- Sample extraction and preparation summary data including dates of sample extraction and analysis and analytical sequence information for each sample set, and each sample dilution and reanalysis.
- Electronic data diskettes or electronic deliverables that provide the summarized results, date of extraction and analysis, quality control data results and true values, client and laboratory sample identifications, analysis methods, dilutions applied and appropriate detection or reporting limits.

All data packages for all analytical parameters shall be reviewed and approved by the analytical laboratory's QA Officer before submittal for validation.

6.2 General Validation Requirements

All analytical data packages from each sample delivery group shall be validated by the detailed review and calculation over-check processes described in "U.S. EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review" (EPA, 2001) and "U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA, 2004). Data validation work will be performed in order to ensure that the laboratory has met all contractual requirements, all applicable reference method requirements, and has met the data quality objectives discussed previously in Section 3 and listed in Tables QAPP-5 through QAPP-7. Validated data will be stored as indicated in procedure TP-2.2-12, "Analytical Data Management" for each sample delivery group. A sample delivery group may be interpreted as a group of 20 samples, or the group of samples delivered to the laboratory in a single sampling event.

The data validator shall document all contacts made with the laboratory to resolve questions related to the data package. The data validator shall complete a data validation checklist applicable for the

specified method, documenting the evaluation of holding times, laboratory and field blanks, laboratory and field duplicates, matrix spikes/matrix spike duplicates, laboratory control samples, method calibration data, and any qualification of analytical results required as a consequence of QC deficiencies. The validation checklist, laboratory contact documentation, copies of the laboratory sample summary reports, and the as-reviewed laboratory data package shall be routed to the Project Manager for data assessment purposes and to the permanent project records.

7.0 QUALITY CONTROL PROCEDURES

All analytical samples shall be subject to quality control (QC) measures in both the field and laboratory. The following minimum field quality control requirements apply to all analyses. These requirements are adapted from "Test Methods for Evaluating Solid Waste" (EPA 1986).

- ***Field duplicate samples.*** Sufficient sample quantities of soil and water for field duplicates will be collected at a frequency of one duplicate per sampling event, or once every 20 samples, whichever is greater. The field duplicates for water samples will be collected from the identical sample stations as stated in the SAP and as close to the original sample collection time as feasible, using identically prepared and preserved containers. Field duplicates will be collected of soil and water samples that are suspected of containing moderate levels of contaminants, based upon field observations. All field duplicates shall be identified with a unique sample identification number and will be analyzed independently as an indication of gross errors in sampling techniques.
- ***Field split samples.*** Sufficient sample quantities for field splits will be collected at a frequency of one split sample per sampling event, or once every 20 samples, whichever is greater. Field split samples will be collected at locations consistent with the SAP. The field splits for soil will be collected from homogenized composite quantities prepared in the field as stated in the SAP. The field splits for water samples will be collected from the identical sample stations as stated in the SAP and as close to the original sample collection time as feasible. The split samples shall be collected using the same equipment and sampling technique, and shall be placed into identically prepared and preserved containers. The field split samples shall be identified with a unique sample ID number and presented to the subcontract laboratory tasked with confirmation and backup analyses for the purpose of monitoring inter-laboratory precision.
- ***Field blanks [Water].*** Preparation of field blanks will be required for analyses of water samples. Field blanks for water samples will be established at a frequency of one blank sample per sampling event, or once every 20 water samples, whichever is greater. Field blanks for water samples consist of each of the following; 1) pure deionized/ distilled water added to the same batch of clean water sample containers and preservative used in the sampling event as a check on possible contamination originating from container preparation methods, shipment, handling, storage, preservatives or site conditions; and 2) pure deionized/ distilled water washed over non-dedicated equipment used for collection of surface and groundwater samples, as a check on possible carry-over contamination originating from inadequate decontamination of field equipment and field conditions. Field blanks for water samples shall be prepared in the field and submitted to the laboratory as a water sample.
- ***Field blanks [Soil].*** Preparation of field blanks will be required for non-dedicated field equipment subject to decontamination procedures. Field blanks for field equipment will be established at a frequency of one blank sample per field sampling campaign. Field blanks for field equipment consist of pure deionized/ distilled water rinsed through a piece of equipment that has undergone the decontamination steps as outlined in Section 4.7. The rinse water collected shall be added to the same batch of clean water sample containers and preservative used during the sampling event. Field blanks for field equipment shall be submitted to the laboratory as a water sample. Field blanks for field equipment are used as a check on possible contamination carry-over from field

equipment that may not have been properly decontaminated between sample collection stations.

The internal quality control checks performed by the analytical laboratory shall meet the following minimum requirements:

- ***Matrix spike and matrix spike duplicate samples.*** Matrix spike and matrix spike duplicate (MS/MSD) samples require the addition of a known quantity of a representative analyte of interest to soil or water samples as a measure of recovery percentage. The laboratory shall be instructed to select the extra sample material provided with a given sample batch for the purpose of reporting MS/MSD recovery. The substitution of non-project related samples for MS/MSD reporting shall not be allowed to replace the Site specific selection of material for MS/MSD. Spike compound selection, quantities, and concentrations shall be described in the laboratories analytical procedures. One sample shall be spiked per analytical batch, or once every 20 samples, whichever is greater.
- ***Quality control reference samples (check samples).*** A quality control reference sample (also known as a Laboratory Control Sample; LCS) shall be prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range established for the samples. The quality control reference sample is analyzed after the initial calibration and before any samples are analyzed, and shall be run with every analytical batch, or every 20 samples, whichever is greater. Reference samples are required as an independent check on analytical technique and methodology. Successful LCS recovery shall be maintained within a 90 to 110% acceptance range.
- ***Method blanks.*** Method blanks are prepared during the preparation of both soil and water samples in the laboratory to determine the proficiency of the laboratory at eliminating fugitive vapors, reagent contaminants, and preparation vessel carryover contaminants. The method blank shall be prepared using the same procedure used for preparation of the samples, at the same time, and involving the same reagents. The method blank must be tested after the quality control reference sample and before any samples are analyzed, and shall be run with every analytical batch or 20 samples, whichever is more frequent.

8.0 DATA ASSESSMENT PROCEDURES

As previously discussed in Section 6 of this QAPP, analytical data shall first be compiled by the analytical laboratory, and reduced to include the specified deliverable elements. The data will be validated by project personnel in compliance with existing validation guidelines and submitted to the Project Manager for data assessment, and to the Client. Data assessment will be performed on the distributions and statistical characteristics of the validated data as established in the Work Plan and will consist primarily of comparisons of the data to applicable regulatory levels and historical data to assist in site characterization and completion of the removal report.

9.0 REFERENCES

(Ecology, 1997); *Analytical Methods for Petroleum Hydrocarbons*, Washington State Department of Ecology Toxics Cleanup Program and the Ecology Environmental Laboratory, Publication No. ECY 97-602, June, 1997

(EPA, 1986); *SW-846 Test Methods for Evaluating Solid Waste, Third Edition, Office of Solid Waste and Emergency Response*, USEPA, November, 1986, Rev. May, 1997

(EPA, 2001); *USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review* (EPA-540/R-00/006) June 2001

(EPA, 2004); *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media/ Multi-concentration, ILM05.3*, March, 2004.

(EPA, 1994); *Guidance for the Data Quality Objectives Process, EPA QA/G-4*, Office of Research and Development, USEPA, (EPA/600/R-96/055), September 1994

(EPA, 2001); *EPA Guidance for Quality Assurance Project Plans*, EPA QA/R-5, (EPA/240/B-01/003), March, 2001.

(USEPA,1999); *USEPA Contract Laboratory Program Statement of Work for Organics, OLM04.2*, August 1999

(USEPA, 2004); *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media/ Multi-concentration, ILM05.3*, March, 2004.

TABLES

TABLE QAPP-1

Golder Technical and Quality Procedures List

TP-1.2-5	Drilling, Sampling, and Logging of Soils
TP-1.4-6a	Manual Groundwater Level Measurement
TP-1.2-6	Field Identification of Soil
TP-1.2-12	Monitoring Well Drilling and Installation
TP-1.2-18	Sampling Surface Soil for Chemical Analysis
TP-1.2-20	Collection of Groundwater Quality Samples
TP-1.2-23	Chain of Custody
TP-2.2-12	Analytical Data Management
QP-5.1	Document Preparation, Distribution, and Change Control
QP-10.1	Surveillance Inspection
QP-11.1	Calibration and Maintenance of Measuring and Test Equipment
QP-14.1	Corrective and Preventive Action
QP-16.1	Quality Assurance Records Management

The complete volume of each technical procedure is available from Golder files.

TABLE QAPP-2

Sample Container Types, Volumes, Handling, Preservation, and Holding Times; Groundwater

GROUNDWATER

Analytes	Analytical Method	Container Type	Special Handling	Preservation	Maximum Holding Time
Petroleum Hydrocarbons (Gasoline to Heavy Oil Range Organics)	NWTPH-HCID	1, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot if Lab QC is to be performed)	HCl, pH <2, store in dark at 4°C.	7 days for extraction, 40 days from date of extraction
Petroleum Hydrocarbons (Diesel Range Organics)	NWTPH-Diesel (extended range)	1, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	HCl, pH <2, store in dark at 4°C.	14 days for analysis
Polychlorinated biphenyl (PCBs) Organic Compounds	EPA 8082A (low level)	**2**, 1,000 mL narrow mouth amber glass bottles, Teflon-lined cap.	Fill to neck, (Collect additional **2,000** mL aliquot for MS/MSD analysis if required)	None. Store in dark at 4°C.	7 days for extraction, 40 days from date of extraction
Carcinogenic Poly-aromatic Hydrocarbon (C-PAHs; Semi volatile Organic Compounds) and Naphthalene	EPA 8270C	1, 1,000 mL narrow mouth amber glass bottles, lined-lined cap.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	None. Store in dark at 4°C.	14 days for extraction, 40 days for analysis after extraction
Metals	EPA 200.7/ 200.8	1, 1,000 ml narrow mouth polymer bottle, with Teflon lined lid.	Fill to neck, (Collect an additional 1,000 mL aliquot for MS/MSD analysis if required)	HNO_3, pH <2, store in dark at 4°C.	180 days from sample collection. Mercury is 28 days from collection.
pH, Temperature, Conductivity, Dissolved Oxygen, Turbidity	See Table QAPP-2	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected	Field Parameters; Sample is not collected

TABLE QAPP-3

Sample Container Types, Volumes, Handling, Preservation, and Holding Times;

SOIL

Analytes	Analytical Methods	Container Type	Special Handling	Preservation	Maximum Holding Time
Petroleum Hydrocarbons (Gasoline to Heavy Oil Range Organics)	NWTPH-HCID	1, 4 oz. Wide mouth soil jar	Fill completely	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Petroleum Hydrocarbons (Diesel Range Organics)	NWTPH-Diesel (extended range)	1, 4 oz. Wide mouth soil jar	Fill completely, (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Polychlorinated biphenyl (PCBs) Organic Compounds	EPA 8082	1, 4 oz. Wide mouth soil jar	Fill completely	None, store in dark at 4°C.	14 days for extraction, 40 days from date of extraction
Carcinogenic Poly-aromatic Hydrocarbon (C-PAHs; Semi volatile Organic Compounds) and Naphthalene	EPA 8270C	1, 4 oz. Wide mouth soil jar	Fill completely, (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	14 days for extraction, 40 days for analysis after extraction
Metals	EPA 6010C / 6020A	1, 4 oz. Wide mouth soil jar, with Teflon lined lid.	Fill completely. (additional 4 oz. aliquot for MS/MSD analysis if required)	None, store in dark at 4°C.	180 days from sample collection. Mercury is 28 days from collection.

Potlatch Corporation / Avery Landing Site / Priority Pollutant Metals / Cleanup Limits

				GROUND & SURFACE WATER						SOIL
Type	Analytes [a]	CAS #	Method[b]	Laboratory Water PQL[c]	Aquatic Life CMC[d]	Aquatic Life CCC[e]	Idaho DEQ Human Health Quality Criteria[f] ALL WATERS	National Primary Drinking Water Standards [g]	Most Protective Cleanup Level for Groundwater	Laboratory Soil PQL[c]
				ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/Kg
Metals	Arsenic	7440-38-2	6020	1.0	340	150	50	10	**10**	1.0
Metals	Antimony	7440-36-0	6020	3.0	NSA	NSA	5.6	6	**5.6**	3.0
Metals	Beryllium	7440-41-7	6020	0.5	NSA	NSA	NSA	4	**4**	0.50
Metals	Cadmium	7440-43-9	6020	0.5	1.3	0.6	NSA	5	**0.6**	0.50
Metals	Chromium	7440-47-3	6020	1.0	570	74	NSA	100	**74**	0.50
Metals	Copper	7440-50-8	6020	1.0	17	11	NSA	1300	**11**	1.0
Metals	Lead	7439-92-1	6020	0.5	65	2.5	NSA	15	**2.5**	5.0
Metals	Mercury	7439-97-6	7470A	0.20	g	g	NSA	2	**2**	0.02
Metals	Nickel	7440-02-0	6020	1.0	470	52	610	NSA	**52**	1.0
Metals	Selenium	7782-49-2	6020	3.0	20	5.0	170	50	**5**	3.0
Metals	Silver	7440-22-4	6020	0.5	3.4	NSA	NSA	100 h	**3.4**	0.50
Metals	Thallium	7440-30-4	6020	**1.0**	NSA	NSA	0.24	2	**0.24**	0.50
Metals	Zinc	7440-66-6	6020	10.0	120	120	7400	5000 h	**120**	3.0

Notes:

NA - Not applicable.

NSA - No standard available.

Standard PQL is above lowest potential cleanup criteria. Alternate analytical methods may be employed.

a - Priority Pollutant metals list.

b - SW846 analytical method 6020 (ICP/MS).

c - PQL; Practical Quantitation Limit established by the laboratory.

From Idaho Administrative Code; IDAPA 58.01.02,210.01 Department of Environmental Quality, Water Quality Standards:

d - Acute Criterion Maximum Concentration (CMC) for numeric cleanup criteria.

e - Chronic Criterion Maximum Concentration (CCC) for numeric cleanup criteria.

f - Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use;

g - Federal Water Quality Criteria, Primary Drinking Water Standards, Maximum Contaminant Levels (MCLs).

h - Federal Water Quality Criteria, Secondary Drinking Water Standards.

Potlatch Corporation / Avery Landing Site / Polyaromatic Hydrocarbons / Petroleum Cleanup Limits

Type	CAS #	Analytes[a]	Method[b]	WATER		SOIL	
				Laboratory WATER PQL[c]	IDTL[d] for Groundwater	Laboratory SOIL PQL[c]	IDTL[d] for Soil
				mg/L	mg/L	mg/Kg	mg/Kg
Carcinogen	56-55-3	Benzo(a)anthracene	8270C	0.01	0.0001	0.013	0.422
	50-32-8	Benzo(a)pyrene	8270C	0.01	0.0002e	0.013	0.042
	205-99-2	Benzo(b)fluoranthene	8270C	0.01	0.0001	0.013	0.422
	207-08-9	Benzo(k)fluoranthene	8270C	0.01	0.0008	0.013	4.22
	218-01-9	Chrysene	8270C	0.01	0.008	0.013	15 f
	53-70-3	Dibenzo(a,h)anthracene	8270C	0.01	0.00001	0.013	0.042
	193-39-5	Indeno(1,2,3-cd)pyrene	8270C	0.01	0.0001	0.013	0.422
Non-Carcinogen	83-32-9	Acenaphthene	8270C	0.1	0.63	0.013	3400 f
	208-96-8	Acenaphthylene	8270C	0.1	0.63	0.013	NSA
	120-12-7	Anthracene	8270C	0.1	3.13	0.013	17000 f
	206-44-0	Fluoranthene	8270C	0.01	0.42	0.013	2300 f
	86-73-7	Fluorene	8270C	0.1	0.42	0.013	2300 f
	91-20-3	Naphthalene	8270C	0.01	0.21	0.013	1.14
	85-01-8	Phenanthrene	8270C	0.1	0.31	0.013	NSA
	129-00-0	Pyrene	8270C	0.1	0.31	0.013	1700 f
	191-24-2	Benzo(g,h,i)perylene	8270C	0.1	0.31	0.013	1177.98
Petroleum	-	Diesel Range Organics[aa]	NWTPH-Dx	0.25	NSA	25	NSA
Petroleum	-	Heavy Oils	NWTPH-Dx	0.5	NSA	50	NSA
Petroleum	-	Mineral Oil	NWTPH-Dx	0.5	NSA	50	NSA

NOTES:

a - Analyte list is from Multi-Media, Multi-Concentration Organic Analytical Statement of Work (OLM04.2)

aa - Petroleum listed compounds are not regulated materials in the State of Idaho, however WA State Ecology analytical methods as presented will be used for characterization, using the indicated PQLs.

b - SW846 analytical method.

c - Practical Quantitation Limit (PQL), established by laboratory.

d - Initial Default Target Levels (IDTL).

e - Federal Water Quality Primary Drinking Water Standard, Maximum contaminant level (MCLs).

f - Region 9 Preliminary Remediation Goals (PRGs) for Residential scenarios.

NA Not applicable.

NSA No standard available.

Potlatch Corporation / Avery Landing Site / Polychlorinated Biphenyl (PCB) Cleanup Limits

Type	Analytes	CAS #	Method[a]	WATER				SOIL		
				Laboratory Water PQL / MDL[b]	Federal Primary Drinking Water MCLs[c]	Idaho Initial Default Target Levels (IDTL)	Most Protective Cleanup Level for Groundwater[e]	Laboratory Soil PQL / MDL[b]	Idaho Initial Default Target Levels (IDTL)	Most Protective Cleanup Level for Soil[e]
				ug/L	ug/L	ug/L	ug/L	mg/Kg	mg/Kg	mg/Kg
PCBs	Aroclor 1016	12674-11-2	8082	0.1 / 0.053	0.1	0.730	0.1	0.05 / 0.0049	2.3343	2.3343
PCBs	Aroclor 1221	11104-28-2	8082	0.1 / 0.0391	0.1	0.028	0.028	0.05 / 0.0099	0.0029	0.0029
PCBs	Aroclor 1232	11141-16-5	8082	0.1 / 0.0106	0.1	NSA	0.1	0.05 / 0.0099	NSA	NSA
PCBs	Aroclor 1242	53469-21-9	8082	0.1 / 0.0133	0.1	0.028	0.028	0.05 / 0.0099	0.0032	0.0032
PCBs	Aroclor 1248	12672-29-6	8082	0.1 / 0.0082	0.1	0.028	0.028	0.05 / 0.0099	0.1374	0.1374
PCBs	Aroclor 1254	11097-69-1	8082	0.1 / 0.07	0.1	0.209	0.1	0.05 / 0.0072	0.7400	0.7400
PCBs	Aroclor 1260	11096-82-5	8082	0.1 / 0.014	0.1	0.028	0.028	0.05 / 0.0041	0.1466	0.1466

Notes:
NSA - No standard available.
Standard PQL or MDL is above lowest potential cleanup criteria.
a - SW846 analytical methods.
b - PQL / MDL; Practical Quantitation Limit and Method Detection Limit respectively, established by the laboratory.
c - National Primary Drinking Water Quality Standard, Maximum Contaminant Levels (MCL), total mixture amount. [40 CFR 141.50].
d - Idaho Initial Default Target Levels, from Idaho Risk Evaluation Manual, FINAL; Version July, 2004.
e - Shaded cells reflect data limits that are not met by the stated Laboratory PQL.

Potlatch Corporation / Avery Landing Site / Inorganic Field Parameter Water Quality Criteria

FIELD TESTS	Point of Compliance	Method[a]	Target Water PQL	Typical Instrument Applied[c]
Temperature	Purge water source	SM2550	0.1 deg. C	Golder Calibrated Mercury Thermometer
pH	Purge water source	EPA 150.1	0.05 units	Orion Model 250Aplus with Combination Glass Electrode.
Specific Conductance	Purge water source	EPA 120.1	5 :mhos	Orion Model 115Aplus with Epoxy 2 Electrode Conductivity Cell.
Turbidity	Purge water source	EPA 180.1	1 NTU	Hach 2100P with dual optical compensation.
Dissolved Oxygen	Purge water source	SM4500-O	0.1 mg/L	Orion Model 810Aplus with Combination Glass Electrode.

Notes:

a - Methods from SW-846, Test Methods for Evaluating Soild Waste (EPA, 1986); Methods for the Chemical Analysis of Water and Wastes (EPA-600/4-79-20; EPA1979); and Standard Methods for the Examination of Water & Wastes (1998, 20th Ed.)

b - PQL: Practical Quantitation Limits established by Manufacturers recommendation.

c - Orion and Hach are registered trademarks.

FIGURE

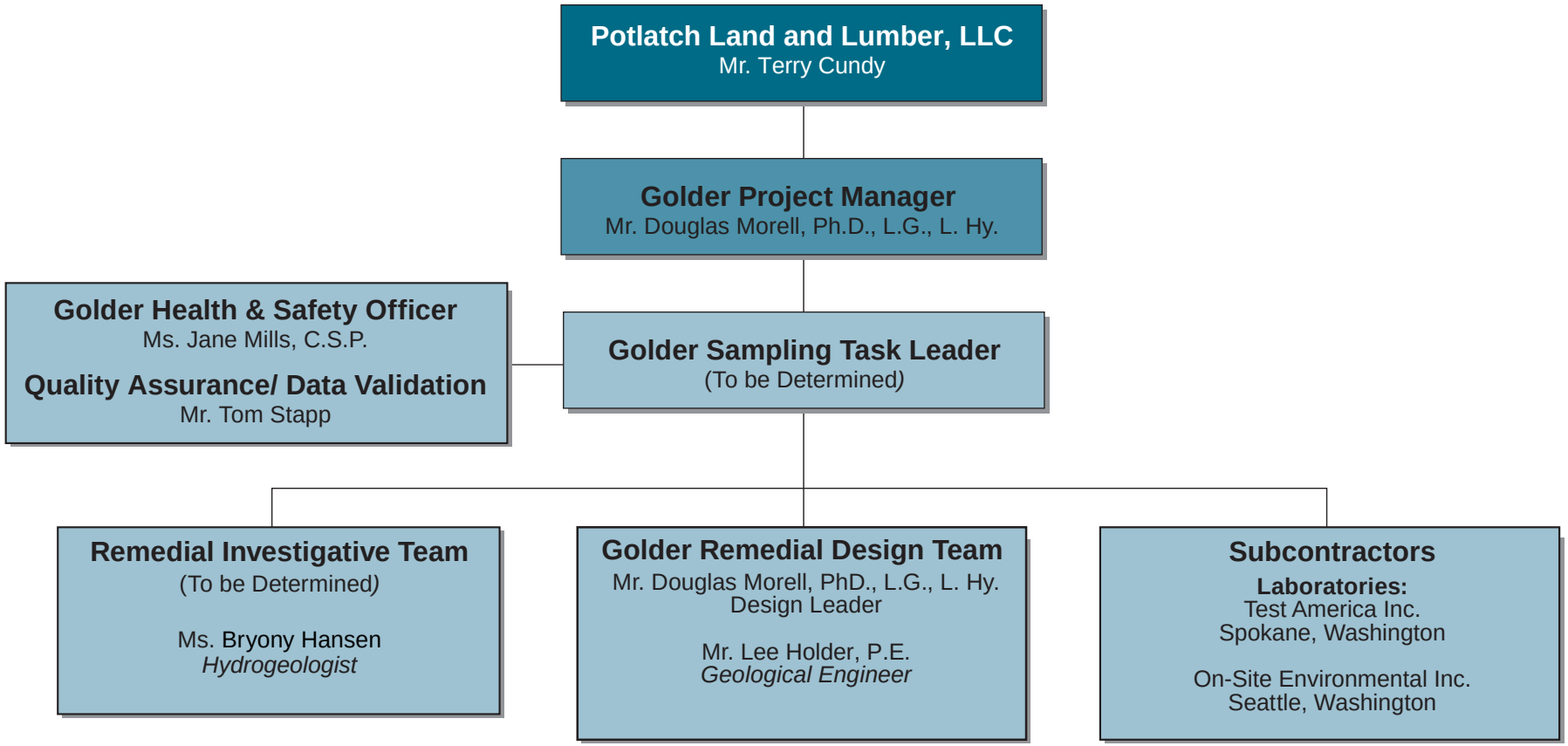

FIGURE **QAPP1-1**
GOLDER PROJECT ORGANIZATION
EE/CA WORK PLAN AVERY LANDING SITE/WA

Golder Associates